

### ABSTRACT

A method that facilitates identification of features in a scene enables enhanced detail to be displayed. One embodiment incorporates a multi-grid Gibbs-based algorithm to partition sets of endmembers of an image into smaller sets upon which spatial consistency is imposed. At each 5 site within an imaged scene, not necessarily a site entirely within one of the small sets, the parameters of a linear mixture model are estimated based on the small set of endmembers in the partition associated with that site. An enhanced spectral mixing process (SMP) is then computed. One embodiment employs a simulated annealing method of partitioning hyperspectral imagery, initialized by a supervised classification method to provide spatially smooth class labeling for 10 terrain mapping applications. One estimate of the model is a Gibbs distribution defined over a symmetric spatial neighborhood system that is based on an energy function characterizing spectral disparities in both Euclidean distance and spectral angle.